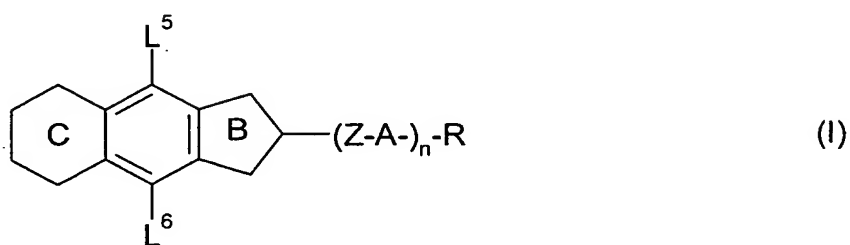
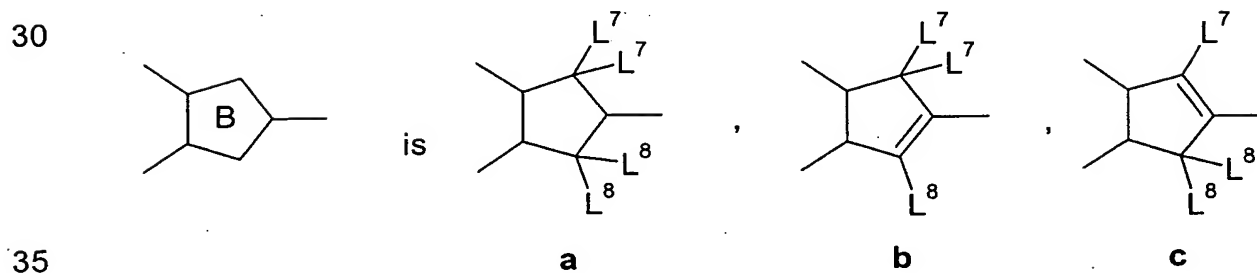
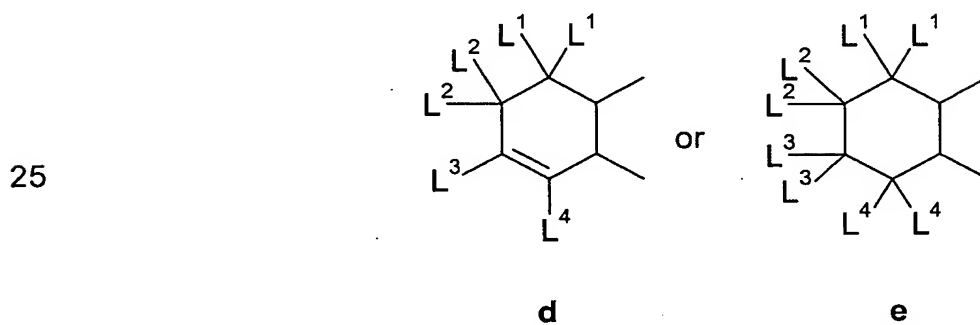
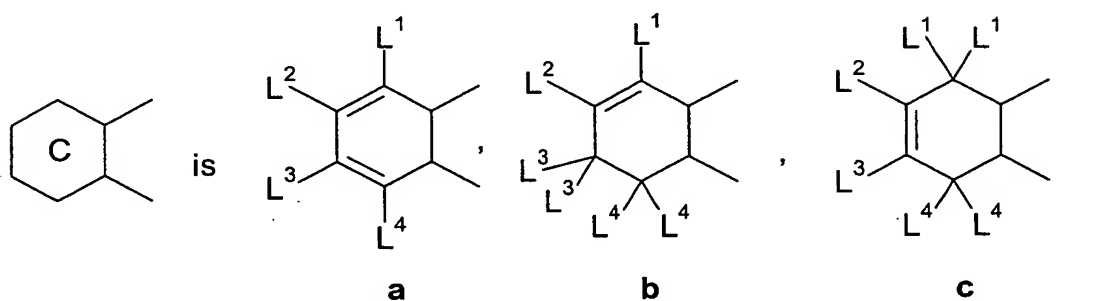


Patent Claims

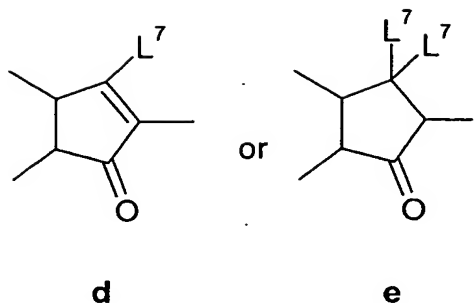
1. Cyclopenta[b]naphthalene derivatives of the general formula (I)



in which:



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Z is in each case, independently of one another, a single bond, a double bond, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{CH}_2\text{CH}_2-$, $-\text{CF}_2\text{CF}_2-$, $-\text{C}(\text{O})\text{O}-$, $-\text{OC}(\text{O})-$, $-\text{CH}_2\text{O}-$, $-\text{OCH}_2-$, $-\text{CF}=\text{CH}-$, $-\text{CH}=\text{CF}-$, $-\text{CF}=\text{CF}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$,

A is in each case, independently of one another, 1,4-phenylene, in which $=\text{CH}-$ may be replaced once or twice by $=\text{N}-$, and which may be monosubstituted to tetrasubstituted, independently of one another, by halogen ($-\text{F}$, $-\text{Cl}$, $-\text{Br}$, $-\text{I}$), $-\text{CN}$, $-\text{CH}_3$, $-\text{CH}_2\text{F}$, $-\text{CHF}_2$, $-\text{CF}_3$, $-\text{OCH}_3$, $-\text{OCH}_2\text{F}$, $-\text{OCHF}_2$ or $-\text{OCF}_3$, 1,4-cyclohexylene, 1,4-cyclohexenylene or 1,4-cyclohexadienylene, in which $-\text{CH}_2-$ may be replaced once or twice, independently of one another, by $-\text{O}-$ or $-\text{S}-$ in such a way that heteroatoms are not directly adjacent, and which may be monosubstituted or polysubstituted by halogen, or is 1,3-cyclobutylene or bicyclo[2.2.2]octane,

R is hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is unsubstituted, monosubstituted by $-\text{CF}_3$ or at least monosubstituted by halogen, where, in addition, one or more CH_2 groups in these radicals may each, independently of one another, be replaced by $-\text{O}-$, $-\text{S}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$ or $-\text{OCO}-\text{O}-$ in such a way that heteroatoms are not directly adjacent, halogen, $-\text{CN}$, $-\text{SCN}$, $-\text{NCS}$, $-\text{SF}_5$, $-\text{CF}_3$, $-\text{OCF}_3$, $-\text{OCHF}_2$ or $-\text{OCH}_2\text{F}$,

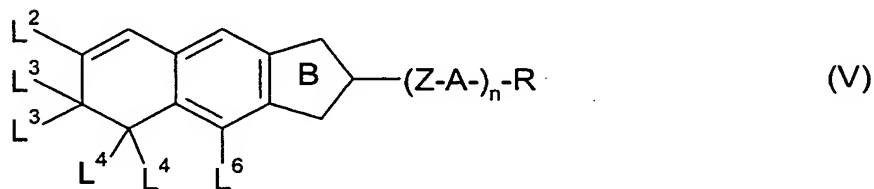
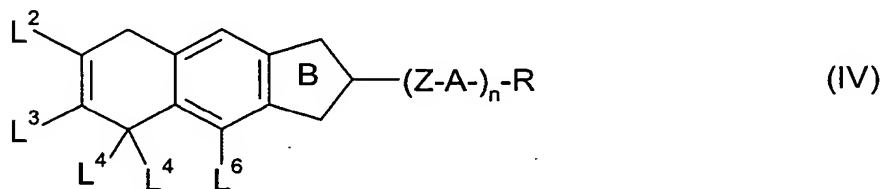
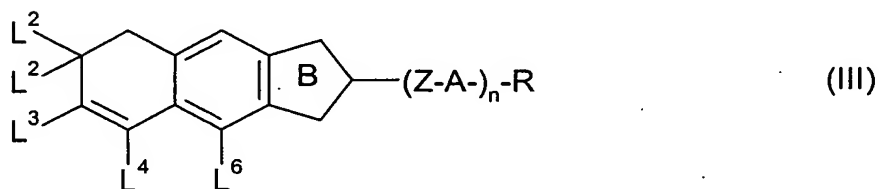
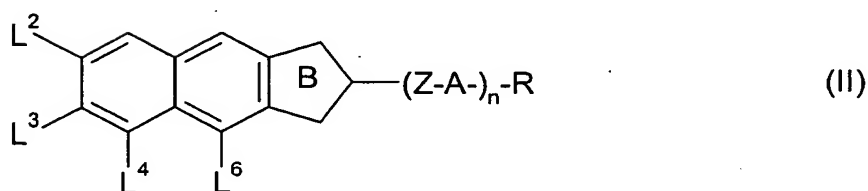
n is 0, 1, 2 or 3, and

L¹ - L⁸ are each, independently of one another, hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15

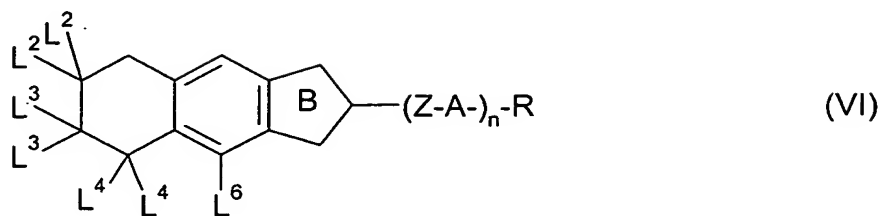
- 86 -

carbon atoms respectively which is unsubstituted or at least mono-substituted by halogen, where, in addition, one or more CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not directly adjacent, halogen, -CN, -SCN, -NCS, -SF₅, -CF₃, -OCF₃, -OCHF₂, -OCH₂F or -(Z-A)_n-R.

2. Cyclopenta[b]naphthalene derivatives according to Claim 1 selected from the general formulae (II) to (VI)



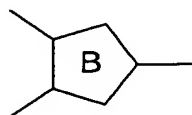
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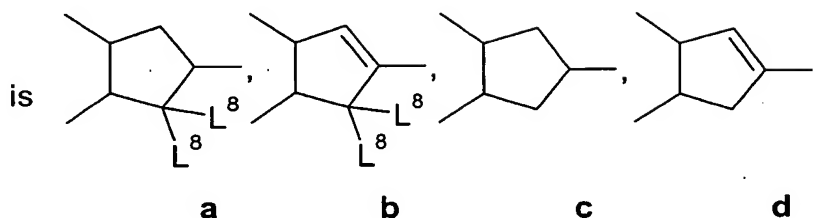
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in which:

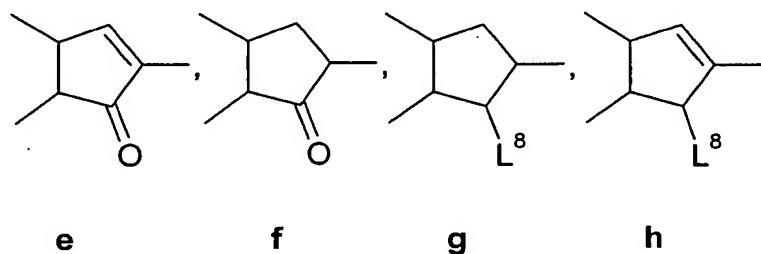
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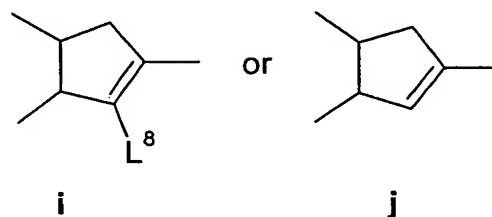
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Z is in each case, independently of one another, a single bond, a double bond, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{CH}_2\text{CH}_2-$, $-\text{CF}_2\text{CF}_2-$, $-\text{C}(\text{O})\text{O}-$, $-\text{OC}(\text{O})-$, $-\text{CH}_2\text{O}-$, $-\text{OCH}_2-$, $-\text{CF}=\text{CH}-$, $-\text{CH}=\text{CF}-$, $-\text{CF}=\text{CF}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$,

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- 5 A is in each case, independently of one another, 1,4-phenylene, in which =CH- may be replaced once or twice by =N-, and which may be monosubstituted to tetrasubstituted, independently of one another, by halogen (-F, -Cl, -Br, -I), -CN, -CH₃, -CH₂F, -CHF₂, -CF₃, -OCH₃, -OCH₂F, -OCHF₂ or -OCF₃, 1,4-cyclohexylene, 1,4-cyclohexenylene or 1,4-cyclohexadienylene, in which -CH₂- may be replaced once or twice, independently of one another, by -O- or -S- in such a way that heteroatoms are not directly adjacent, and which may be monosubstituted or polysubstituted by halogen, or is 1,3-cyclobutylene or bicyclo[2.2.2]octane,
- 10 R is hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is unsubstituted, monosubstituted by -CF₃ or at least monosubstituted by halogen, where, in addition, one or more CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not directly adjacent, halogen, -CN, -SCN, -NCS, -SF₅, -CF₃, -OCF₃, -OCHF₂ or -OCH₂F,
- 15 L², L³ and L⁸ are each, independently of one another, hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is unsubstituted or at least monosubstituted by halogen, where, in addition, one or more CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not directly adjacent, halogen, -CN, -SCN, -NCS, -SF₅, -CF₃, -OCF₃, -OCHF₂, -OCH₂F or -(Z-A)_n-R,
- 20 L⁴ and L⁶ are each, independently of one another, hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is at least monosubstituted by halogen, where, in addition, one or more CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not directly adjacent, halogen, -CN, -SF₅, -SCN, -NCS,
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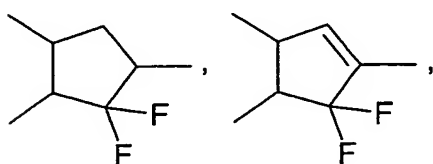
-CF₃, -OCF₃, -OCHF₂ or -OCH₂F, preferably with the proviso that L⁴ and L⁶ cannot simultaneously be hydrogen, and

n is 0, 1, 2 or 3.

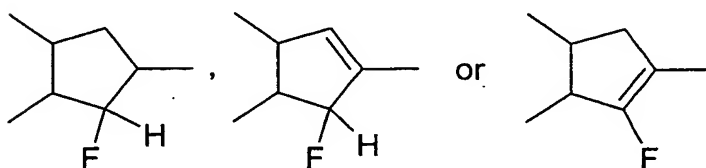
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3. Cyclopenta[b]naphthalene derivatives according to Claim 2, characterised in that B is

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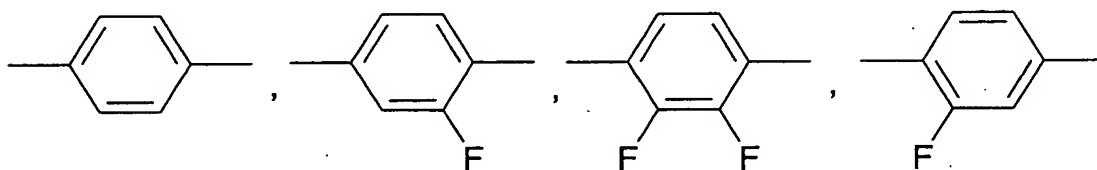
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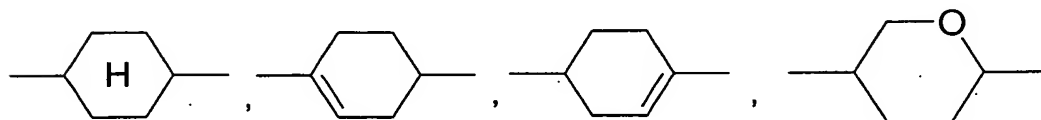
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4. Cyclopenta[b]naphthalene derivatives according to Claim 2 or 3, characterised in that A is

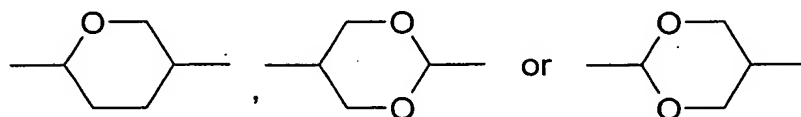
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5. Cyclopenta[b]naphthalene derivatives according to at least one of Claims 2 to 4, characterised in that L^2 and L^3 , independently of one another, are hydrogen, an alkoxy radical having from 1 to 7 carbon atoms, fluorine or chlorine.

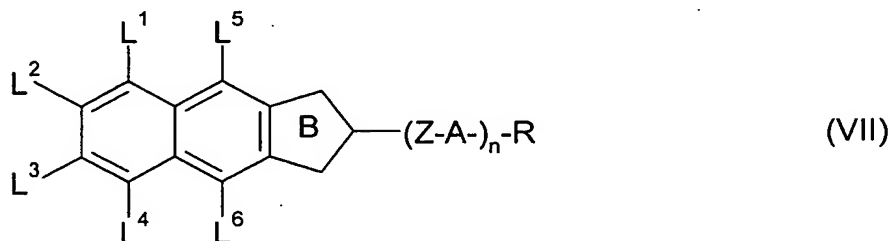
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6. Cyclopenta[b]naphthalene derivatives according to at least one of Claims 2 to 5, characterised in that L^4 and L^6 , independently of one another, are $-CF_3$, fluorine or chlorine.

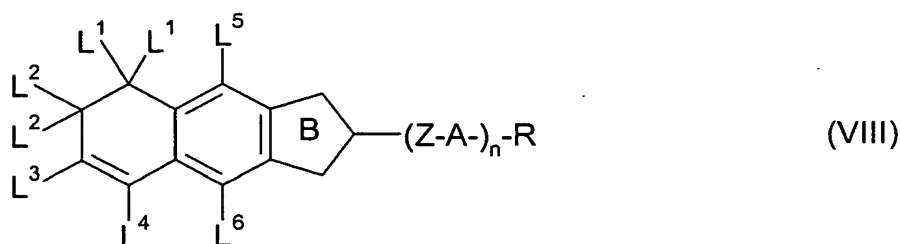
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7. Cyclopenta[b]naphthalene derivatives according to Claim 1, selected from the general formulae (VII) to (XI)

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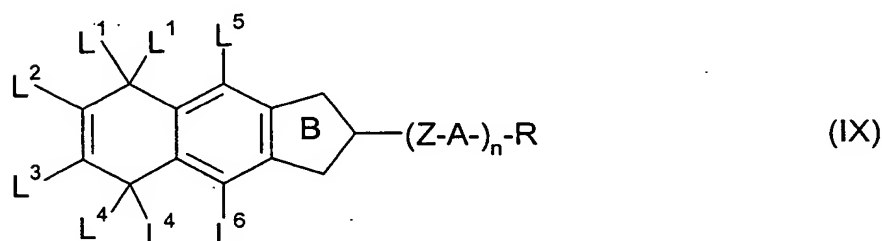


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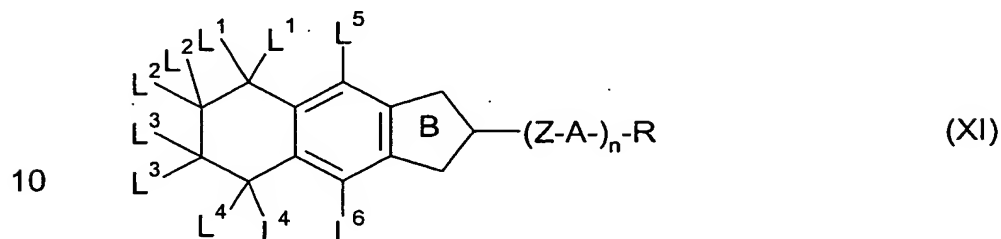
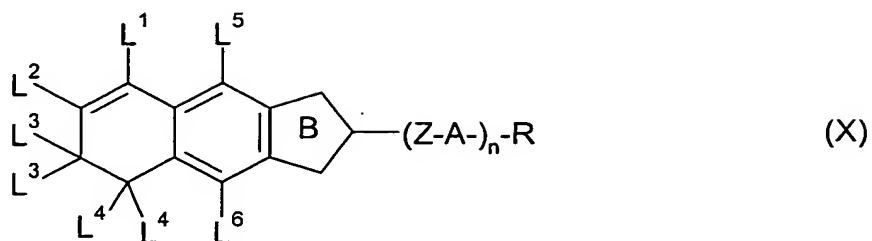
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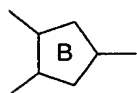


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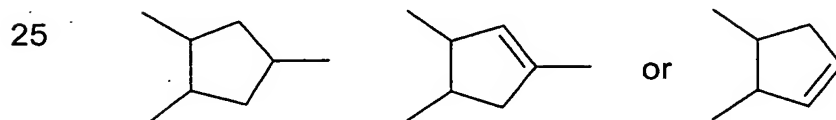


15 in which Z, A, R, n, L¹ to L⁸ and



20 are as defined in Claim 1.

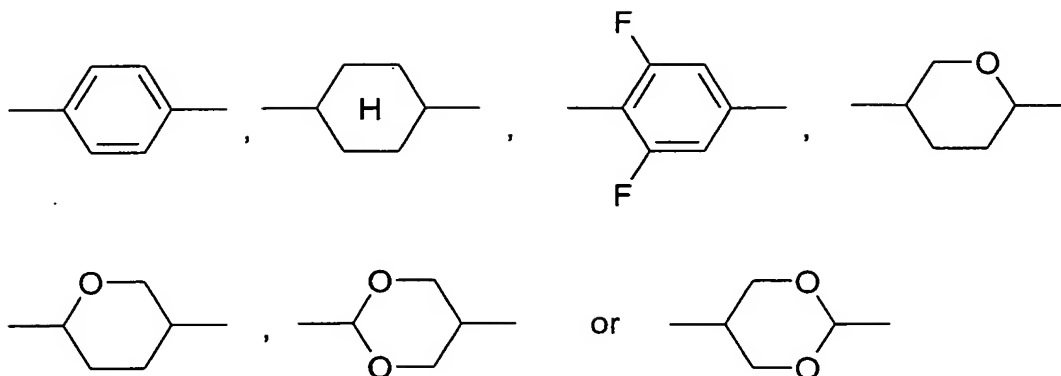
8. Cyclopenta[b]naphthalene derivatives according to Claim 7, characterised in that B is



30 9. Cyclopenta[b]naphthalene derivatives according to Claim 7 or 8, characterised in that A is

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10. Cyclopenta[b]naphthalene derivatives according to at least one of Claims 7 to 9, characterised in that L^2 and L^3 , independently of one another, are identical or different and are hydrogen, halogen, -CN, -SCN, -NCS, -SF₅, -CF₃, -CHF₂, -OCF₃ or -OCHF₂.

11. Cyclopenta[b]naphthalene derivatives according to at least one of Claims 7 to 10, characterised in that L^1 and L^4 , independently of one another, are identical or different and are hydrogen or fluorine.

12. Cyclopenta[b]naphthalene derivatives according to at least one of Claims 7 to 11, characterised in that L^5 and L^6 are hydrogen.

13. Cyclopenta[b]naphthalene derivatives according to at least one of Claims 7 and 12, characterised in that L^1 , L^2 , L^3 and L^4 are fluorine and L^5 and L^6 are hydrogen.

14. Cyclopenta[b]naphthalene derivatives according to at least one of the preceding claims, characterised in that Z is a single bond, -CF₂O-, -OCF₂-, -CF₂CF₂-, -CH=CH-, -CF=CH-, -CH=CF- or -CF=CF-.

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15. Cyclopenta[b]naphthalene derivatives according to at least one of the preceding claims, characterised in that R is an alkyl radical, alkoxy radical or alkenyl radical having from 1 to 7 or 2 to 7 carbon atoms respectively.

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16. Use of cyclopenta[b]naphthalene derivatives according to at least one of the preceding claims in liquid-crystalline media.

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17. Liquid-crystalline medium comprising at least two liquid-crystalline compounds, characterised in that it comprises at least one cyclopenta[b]naphthalene derivative according to at least one of Claims 1 to 15.

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18. Electro-optical display element containing a liquid-crystalline medium according to Claim 17.

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19. Mesogenic medium, characterised in that it comprises at least one cyclopenta[b]naphthalene derivative according to at least one of Claims 7 to 15.

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20. Electro-optical light-control element which contains an electrode arrangement, at least one element for polarisation of the light and a mesogenic control medium, where the light-control element is operated at a temperature at which the mesogenic control medium in the unaddressed state is in the isotropic phase, characterised in that the mesogenic control medium comprises at least one cyclopenta[b]naphthalene derivative according to at least one of Claims 7 to 15.

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